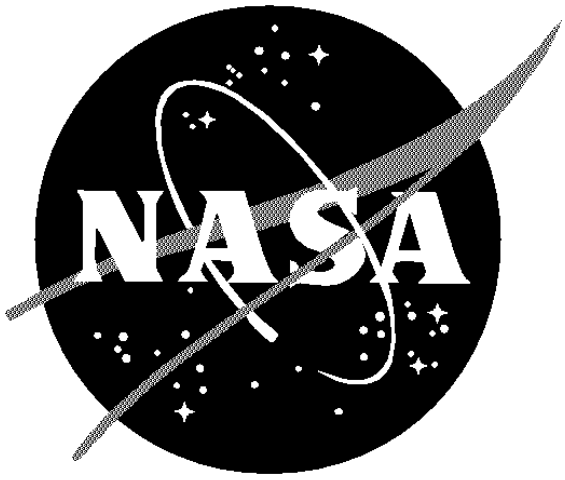

National Aeronautics and Space Administration

May 8,

CAN-97-MTPE-02

A COOPERATIVE AGREEMENT NOTICE

Extending the Use and Applications Of Mission To Planet Earth (MTPE) Data and Information to the Broader User Community

A Cooperative Agreement Notice for the Earth Observing System Program

Letters of Intent Due June 11, 1997
Proposals Due July 14, 1997 by 4:30 p.m. (EST)

Extending the Use and Applications Of Mission To Planet Earth (MTPE) Data and Information to the Broader User Community

This NASA Cooperative Agreement Notice (CAN) solicits proposals from all sources for development of innovative uses and applications of Mission To Planet Earth (MTPE) science research results and associated data. The intent of this solicitation is to stimulate broad public use of MTPE's environmental data and/or to produce value added services to stimulate U.S. economic growth, improve the quality of life, and contribute to the implementation of a National Information Infrastructure.

In the last few years, NASA has launched more Earth science missions than in any similar period in recent history. The decade of the 1990s is a new era of NASA scientific and applications research and development. The upcoming Earth Observing System (EOS) is an effort to study the Earth as a system while monitoring long-term changes on a global scale. Earth observations are being made in a wide spectrum of wavelengths, sampling rates, and resolutions.

The science activities of MTPE are obtaining massive volumes of new observational data with unprecedented temporal, spectral, and spatial resolution and are providing considerable information through the results of research and the production of derived research data products. New information technologies play a critical role in dealing with the massive volumes of data and enable its distribution to potential user communities beyond the traditional area of environmental research. This should lead to gains in education, quality of life, and economic growth.

The Earth Observing System Data and Information System (EOSDIS) archives, distributes, and manages all data and information from MTPE activities and other data required for production and effective use of these data. At present, the production, distribution and user services are being provided by a set of Distributed Active Archive Centers (DAACs). The National Research Council has recommended that NASA shift its EOSDIS implementation of these functions to a federation of competitively selected Earth Science Information Partners (ESIPs). These partners may be divided into three types. Type 1 ESIPs are responsible for standard data and information products and associated services whose production requires considerable emphasis on reliability and disciplined adherence to schedules. Type 2 ESIPs are responsible for data and information products and services in support of Global Change Research (other than those provided by the Type 1 ESIPs) that are developmental or research in nature and where emphasis on flexibility and creativity is key to meeting the advancing research needs. Type 3 ESIPs are those providing data and information products and services to users beyond the Earth System Science Global Change research community and who receive cooperative agreements with NASA MTPE in order to extend the benefits of MTPE beyond the research community or to enhance EOSDIS.

This CAN solicits proposals for those wishing to be Type 3 Working Prototype-ESIPs (WP-ESIPs) designed to extend the benefits of the EOSDIS data and information beyond the MTPE research to part or all of the broader user community. Potential application areas of interest include, (but are not limited to): atmospheric, oceanic, and land monitoring; water resources management; publishing; agriculture; forestry; health or vector-borne disease monitoring; transportation; aquaculture; mineral exploration; land-use and urban planning; libraries; cartography; education (K-12, university level, professional); entertainment; environmental hazards monitoring; marine and ocean applications; and other areas relating to the use of spatial data.

Proposers are encouraged to capitalize on existing or emerging technologies, tools, and capabilities that are commercially available or within the public domain. Library and information science technology development, as required by applications, is anticipated. NASA encourages original and innovative proposals for effective applications of NASA's Earth science data bases for educational, governmental, non-profit, and commercial purposes to benefit broad and diverse segments of society. The fusion and integration of NASA Earth science data with those of other federal agencies, state and local governments, non-government organizations and private sources is encouraged. It is anticipated that this type of data fusion will bring significant innovations concerning beneficial use and applications of these data.

Participation in this program is open to all categories of domestic organizations. It is also open to international organizations on a no-exchange-of-funds basis. Organizations include industry, educational institutions, nonprofit organizations, non-governmental organizations, federal, state, and local government agencies, and NASA centers as members of proposing teams. Joint proposals are encouraged that demonstrate effective partnerships or cooperative arrangements among institutions and among the government, non-profit and commercial sectors. NASA funding will be provided only for new or qualitatively expanded activities and not to continue on-going operations of the proposers. NASA funding will not be provided to other government agencies to fulfill their legislatively mandated requirements but to enable joint activities and the working prototype use of NASA data and information. Funding for selected Type 3 WP-ESIPs can extend for no longer than five years and the levels of NASA support must decrease significantly in each performance year after the second. Cooperative agreements with NASA may extend for longer provided that they do not require continued NASA funding. Successful proposals under this CAN are not eligible for renewal or time extension through subsequent CANs.

Investigators shall submit proposals by July 14, 1997. Peer review panels will evaluate the proposals. Selection of successful proposals is planned for mid-October 1997, but selection may be sooner or later depending on the number of proposals received. NASA will directly contact both successful and unsuccessful proposers.

Printed copies of this CAN and the documents it references are available by request by calling (202) 358-3552 and leaving a voice message. Please leave your full name and address, including zip code and your telephone number, including area code.

Section 1 discusses the scope of this CAN including the objectives and technical approach. Section 2 details the proposal evaluation factors and process. Details concerning the funding of this CAN and the expected cost sharing are found in Section 3. The appendices to this announcement include further details relevant to this program. Appendix A provides a technical background of the MTPE program and science objectives along with background information on EOSDIS and NASA's concept for the Federation. Appendix B contains the instructions required for responding to this CAN. Appendix C contains information on MTPE data products and refers proposers to the EOSDIS Science Data Plan for current information on the data and information products of EOSDIS and to the MTPE Science Plan for a clear statement of the research priorities of this program. Appendix D contains a list of acronyms. Please use identifier number CAN-97-MTPE-02 when making an inquiry regarding this Notice.

NASA's ability to fund the cooperative agreements selected under this CAN are contingent upon the availability of appropriated funds.

Your interest and cooperation in participating in the Extending the Use and Applications Of Mission To Planet Earth (MTPE) Data and Information to the Broader User Community NASA Cooperative Agreement Notice are appreciated.

W. F. Townsend
Acting Associate Administrator for Mission to Planet Earth

Extending the Use and Applications Of Mission To Planet Earth (MTPE) Data and Information to the Broader User Community

1.0 Program Scope

This CAN is issued under regulations 14 CFR Part 1260 and 14 CFR Part 1274.

1.1 Goals

The goal of this CAN is to solicit proposals for Type 3 Working Prototype Earth Science Information Partners (WP-ESIPs) which will extend the use and application of MTPE's data and information to users beyond the research community. The Type 3 WP-ESIPs selected as a result of this CAN, along with the Type 2 WP-ESIPs selected under the companion CAN-97-MTPE-01, will become the initial members of an environmental information Working Prototype Federation (WP-Federation) as described in paragraph 1.4 and Appendix A, Sections 3 and 4.

1.2 Objectives

The goals of the Type 3 WP-ESIPs are to:

- Improve the access and expand the immediate relevancy of MTPE's science results and data to the value-added industry, universities, non-profit organizations, and the general public by involving a broader user community which will apply these results and data to near-term resource management problems.
- Expedite the realization of social and economic benefits of MTPE data beyond global change research through the multiplier effect generated by involvement outside of NASA and particularly in the private sector.
- Transform the MTPE science products into new and innovative applications oriented information products that are designed to meet the needs of specific markets or user communities and that lead to gains in Earth resource management, economic growth, and overall quality of life.
- Leverage non-NASA capabilities in remote sensing, environmental activities and information systems in order to cost-effectively extend the social and economic benefits of MTPEs research to a broader user community and thereby, enhance the relevance of NASA’s scientific activity to societal benefits.
- Fuse, integrate and assimilate MTPE generated data with Geographic Information Systems (GIS's) and other technologies presently in use by other Federal agencies, state and local governments, value-added companies, private sector users, and various non-governmental organizations (NGO's).
- Develop and experiment with processes to make Earth science data easy to preserve, locate, access, and use for practical applications within the context of an environmental information WP-Federation.

1.3 Approach

The approach consists of establishing partnerships with other Federal agencies, state and local governments, universities, non-governmental organizations, non-profit organizations, and private companies to carry out the Type 3 WP-ESIP function. The general emphasis of these partnerships would be on stimulating the emergence of a set of service providers, including those offering additional data sets. The partnerships may result in the incubation of new value-added providers, as well as the addition of new product lines to established value-added companies and other organizations. Central to the function of the Type 3 WP-ESIPs is the function of transforming the MTPE science products into market driven applications products designed to meet the needs of a particular groups of users. These products may be developed by, for example, value-added providers in response to a commercial demand or potentially by a governmental or non-profit organization and distributed as a public good or service.

1.4 Purpose of the Federation

The purpose of the WP-Federation is to experiment with and evolve processes to make Earth science data easy to preserve, locate, access and use for all beneficial applications, including research, education, and commercial, many of which may cross the Federation membership. The WP-Federation is intended to enhance participation of the broad scientific and applications user community in the implementation and governance of the EOSDIS program. NASA is adopting a deliberate and incremental approach by implementing an initial limited set of working prototype federated projects through this CAN and the companion CAN-97-MTPE-01.

1.5 Government Collaboration

NASA will contribute to the WP-Federation by:

- assisting in the evolution of Federation governance;
- encouraging and facilitating effective bottoms-up WP-Federation management;
- providing technical assistance through the Earth Science Data Information System (ESDIS) Project at the Goddard Space Flight Center (GSFC) on issues such as interoperability designed to facilitate the successful operation of the WP-Federation; and
- providing for the re-use of EOSDIS Core Systems (ECS) software where applicable by law.

When NASA centers are part of the proposing teams, their participation will be defined as part of the government collaboration under the cooperative agreement.

1.6 Related Activities

A recent Conference (see Appendix C, Section 3.2 for reference on the Conference Proceedings) on EOSDIS Potential User Model Development (June, 1995) concluded that, although EOSDIS was designed and is being implemented primarily in support of the Global Change Research community, EOSDIS can potentially support the needs of a broader range of public and private sector users such as agribusinesses, state, regional and urban planners, mineral and petroleum firms, timber companies, rangeland managers and many other organizations which have a need for timely spatial, geobased data. In order to extend the benefits of EOSDIS data to these users, it was recommended that EOSDIS should take steps to help meet the needs of the broader potential EOSDIS user community, directly and through partnerships. It was also recommended that EOSDIS should seek ways to enhance its interactions with local, state, national, and international data and information systems, both in the public and private sectors; and seek innovative ways to educate the potential user community about the utility of its data, information, tools and services. This CAN is intended to respond to this need by extending the use and applications of EOSDIS products and related science results beyond research to a broader user community through the establishment of Earth Science Information Partners (ESIP #3's).

As an initial step, the Office of Mission to Planet Earth completed a preliminary study of the relative potential of the EOSDIS products for applications in the private and public user communities. The study reviewed the stated accuracy, temporal resolution, horizontal resolution/coverage and vertical resolution/coverage of each of the products versus the requirements of the applications user community in 18 potential user areas. These areas or economic market segments broadly include the full range of current applications areas in which remote sensing currently plays an important role now or in the near future. The user areas were identified as follows:

1. Economic Development (those factors both developmental and conservationist that go into the examination of sustainability
2. Urban and Regional Planning

3. Mapping, Charting and Geodesy
4. Land Use/Land Cover
5. Agriculture
6. Forestry
7. Rangeland
8. Emergency Management
9. Transportation
10. Exploration/Extraction Geology
11. Weather and Climate
12. Air Quality
13. Water Quality
14. Water Resources
15. Fisheries
16. Marine(including ship routing)
17. Recreation and Tourism
18. Intelligence Community

As a result of this preliminary study, products from five EOS instruments were identified as having the most important potential for applications: Landsat ETM+, MODIS, ASTER, EOS Color, and TES. In total, 18 of the 21 total EOS instruments were identified as having some potential commercial application in one or more of the eighteen application areas. Some instrument products such as Landsat ETM+ are seen as universal in their ability to acquire commercially relevant data across all or most of the application areas. Others are more specific, but highly relevant to their narrow niche such as EOS Color. Appendix C Section 1.0 shows a summary of data products from each of the instruments and their importance to the individual application areas.

The preliminary results of this EOS specific study are provided for information and as a starting point for the further assessment of the extension of the overall MTPE science results and data into the private and public applications realm. The purpose of the CAN is to provide an expanded opportunity for an in-depth, multi-year assessment of the applicability of the EOS and other MTPE science and products to the broader range of private and public users and to solicit innovative approaches in carrying these assessments as an Earth Science Information Partner through jointly funded multi-year projects.

2.0 Proposal Evaluation

2.1 Proposal Evaluation Factors

The following factors will be used to evaluate proposals. Factors one and two have equal weight and are weighted higher than factor three.

2.1.1 Factor 1. The Technical Approach to Meeting the CAN Goal of Extending the Use and Application of MTPE's Data and Information to a Broader User Community.

- The innovative ability to take advantage of unique capabilities (e.g., new and emerging information technologies) in industry, academic, non-profit institutions, or the government sector (including state, local, and federal) in order to serve a targeted user group(s);

- The feasibility soundness, logic, and practicality of the proposed technical methods, system descriptions and concepts;

- The clear identification of user needs and benefits from proposed products or services including the target user market or niche, geographical area, or discipline to be supported, and a full understanding of the needed project's data requirements to satisfy that market;

- The value of the products and services, including data, information, documents, data analysis and visualization tools, search tools, and analysis services to the targeted user community.

2.1.2 Factor 2. The Cost Effectiveness and Benefits of the Proposed Cooperative Activity.

- The cost to NASA relative to the public benefit through the provision of the proposed products and services;

- The level of cost sharing or the leverage to NASA's funding;

- The likelihood that the effort will become self-sustaining;

- The potential benefits and cost savings to Earth System Science Researchers;

- The likely contribution of the proposed WP-ESIP to improved understanding of environmental information federation approaches.

2.1.3 Factor 3. The Management Plan and Experience

- The feasibility of the management approach along with the methods and concepts demonstrated by the proposal;

- The demonstrated competence and relevant experience of the proposers as an indication of their ability to carry the proposed activity to a successful conclusion (the proposal must show the qualifications and capabilities of the Project Lead, management team, and key personnel relevant to the success of the proposed activity);

- Institutional resources and the degree of commitment to the proposed activity;

- The adequacy of the facilities and equipment to support the proposed activity;

- The adequacy of metrics and other statistics to be collected that will measure the success of the activity;

- The clarity and effectiveness of any teaming arrangements.

2.2 Proposal Evaluation Process

Selection decisions will be made following peer review of the proposals. Proposals are subject to scientific review b discipline specialists in the area of the proposal. The proposals will be subject to the full, external peer-review technique (with due regard for conflict-of-interest and protection of proposal information), first by mail and then by assembling panels of the mail reviewers. NASA reserves the right to make judgments during the final project solution based on programmatic factors. This means that the set of projects will be chosen with thought to programmatic balance and to the success of the overall goals of the WP-ESIP and the WP-Federation experiment. The final decisions will be made by the Acting Associate Administrator, Office to Mission to Planet Earth.

The evaluation process will be conducted by the MTPE Science Division at NASA Headquarters. Peer-review panels may be subdivided or combined, depending on the number and kinds of proposals received. A NASA official will chair a final cross-panel review upon completion of the reviews by individual panels to develop a recommendation for the total program. The cross-panel review will review investigations spanning more than one area and arrive at an overall programmatic recommendation across all panels.

3.0 Financial Details

3.1 Program Resources

3.1.1 Overview.

The CAN solicits proposals which would receive varying levels of NASA financial support. NASA intends to fund 5 to 15 proposals at an aggregate level of $ 3 million per year. These activities would be funded for periods of up to five years to allow user acceptance and market development to build to sustaining levels. Typically, NASA provided resources will range from $200K to $600K for each fiscal year of the cooperative agreement. Except as noted in Section 3.1.2, cooperative agreements will be used as funding vehicles for the Earth Science Information Partnership Program.

The financial arrangements for each project may vary depending on the nature of the Project Lead's (PL's) home organization as discussed in Paragraph 3.1.2. In regards to for-profit organizations, a basic requirement is that the proposing organization provide 50 percent cost-sharing of the projects throughout the period of performance. The cost-sharing can consist of non-cash resources and must meet or exceed the level of funding provided by NASA in any given year except as noted in Section 3.1.2. In all cases, the NASA funding can extend for no longer than five years and the levels of NASA support must decrease significantly in each performance year beginning with the third year. The end objective and overall success criteria is that the partner organization be self-sustaining at the end of five years and not require continued NASA funding. A self-sustaining status can be achieved through the evolution of the ESIP to a for-profit business or through the funding by a source (e.g., another Federal agency, state government, non-profit organization) other than NASA.

3.1.2 Financial Arrangements.

Specific financial arrangements may vary depending on the nature of the PL's home organization as follows:

Institutions of Higher Education, Non-Profit Organizations, and State and Local Governments. For universities, non-profit organizations, and state and local governments, Cooperative Agreements (CAs) will be negotiated, with the planned value to be approximately $200K to $600K per year for the first year. NASA may elect to fund all or most project resources for the ESIP but selection will be based in-part on the percentage and nature of the proposed institution funding.

For-Profit Organizations. With for-profit organizations, CAs will be negotiated with cost sharing requirements. The total NASA contribution to that CA will depend on the contribution by the for-profit project team, but will in no event exceed 50% of the total project value. Note that no fees are allowable or payable under cooperative agreements.

Federal Agencies/National Laboratories. Successful proposers from other Federal agencies and non-NASA National Laboratories including Government Owned, Contractor Operated (GOCO) Laboratories will use their own agency's appropriated funds to cover the costs associated with their participation. NASA will not provide funding for other Federal agencies and non-NASA National Laboratories to participate as a Type 3 ESIP. Required work to be performed will be documented via a memorandum or agreement between the other agency laboratory and NASA.

Non-U.S. Organizations. See Appendix B, Section 6.0

3.2 Resource Sharing

The basis for the determination of the value of the proposer's contribution to the program shall be clearly documented in the proposal and follow guidelines contained in OMB Circular 110, Section 23 (see Sections 1274.202 (c) (b) and 1274.904 of NASA Handbook).

3.3 Resource Verification

Any non-NASA resources included in the proposed effort costs shall be verified with a letter signed by an authorized representative of the resource's organization(s) providing these resources(s). This letter shall be attached to the standard prefatory material referenced in Appendix B. The letter shall indicate the resources contributed and any conditions concerning the use of resources.

4.0 Cancellation of CAN

NASA reserves the right to make no awards under this CAN and, in the absence of program funding or for any other reason, to cancel this CAN by having a notice published in the Commerce Business Daily. NASA assumes no liability for canceling the CAN or for anyone's failure to receive actual notice of cancellation.

5.0 Preproposal Conference Instructions

A joint Preproposal Conference for this CAN and its companion CAN-97-MTPE-01 will be conducted prior to submission of the proposals. The objective of the conference will be to allow potential proposers the opportunity to discuss the CAN in detail. Proposers will be given adequate time to ask questions of the program management. Attendees will be provided with written responses to all questions.

The Preproposal Conference will be held in the Washington D.C. metropolitan area. The Preproposal Conference information and logistics will be available on the MTPE Home Page, at the address given below, prior to the Preproposal Conference. Please check the Home Page for details prior to attending the Preproposal Conference.

http://www.hq.nasa.gov/office/mtpe/nra.html

6.0 General Information

Obtain additional general information:

Email: mtpeeval@hq.nasa.gov

OR

Alex Tuyahov
NASA Headquarters
Code YS, MTPE
Washington, D.C. 20546
(202) 358-0250

7.0 Schedule

The schedule for the review and selection of proposals for this CAN is as follows:

May 8, 1997	CAN Distributed
May 28, 1997	Preproposal Conference
June 11, 1997	Letters of Intent Due
July 14, 1997	Responses Due
October, 1997	Selection announcement

Appendix A. Technical Description and Background

1.0 NASA's Mission to Planet Earth Program

The Mission to Planet Earth (MTPE) program was conceived almost a decade ago, in an era of growth in funding for global environmental research. The scientific framework for the program was broad and ambitious, with the overarching goal of integrating the Earth and environmental sciences into an interdisciplinary study of Earth system science. MTPE became a major observational and scientific element of the U.S. Global Change Research Program (USGCRP), a program that has significantly changed the style and technical content of Earth science research in this Nation and the world.

Unfortunately, we are in a period where government support for science and technology is declining, and MTPE and the USGCRP must work with the scientific community to make difficult choices. The forces which drive global change have not subsided, and societies worldwide are looking to the power of science and technology for solutions to the 21st Century problem of expanding prosperity to a broader community of humankind. The challenges of increasing food production, managing natural resources like water and wood in a sustainable manner, and designing an eventual transition to renewable energy supplies demand practical solutions. Changes in the climate system, whether of natural or human-induced origin, must also be forecast with improved skill to improve agriculture and reduce economic impacts of floods, droughts, and other weather-related hazards. Success in moving toward environmental and economic security for the U.S. and other nations will require a focus and consistency of effort like that which ended the forty year cold war. To these ends, the MTPE has an increased emphasis on near-term applications of scientific data. The MTPE Science Plan (see Appendix C, Section 3 for reference) targets five specific research issues for focused investment of program resources during the next five years.

Predictions of global change show enormous potential for climatic, biological, and hydrological consequences as a result of human activity. Given the critical observational limitations now faced by researchers, even the most comprehensive models produce answers that are hedged with uncertainty. The space-based component of the NASA Mission to Planet Earth program will monitor environmental changes to advance understanding of the entire Earth system, developing a deeper comprehension of the components of that system and the interactions among them. To quantify changes in the Earth system, MTPE will provide systematic, continuous observations from low Earth orbit for a minimum of 15 years. By enhancing understanding of the processes involved, MTPE will help discriminate anthropogenic and natural changes.

Scientists need long-term, consistent measurements of the key physical variables that define the shifts in state and variability of Earth system components that is, the atmosphere, hydrosphere, cryosphere, oceans, and land surface. Lacking these measurements, predictions of the complex responses of the Earth system to human activities and natural variations lack an adequate baseline to determine trends. The scientific community agrees that space-based observations hold the key, because satellites provide the only means of capturing a global perspective.

To date, remote sensing of the Earth system largely has consisted of discipline-oriented missions focused on a narrow range of physical phenomena and problems. While the current approach has led to significant gains in understanding the atmosphere, hydrosphere, and biosphere, it does not provide enough information about the coupling of these systems. The fluxes of mass (i.e., water, CO_2, and other trace constituents), heat, and momentum between the land and atmosphere and between the ocean and atmosphere cannot be quantified using data from this discipline-specific approach. Furthermore, current computer simulations include only elementary models of these interactions. These very interactions drive important changes in the Earth system.

To determine the magnitudes and spatial variations of global change, consistent global measurements are needed over a long enough period so that natural variabilities associated with seasons and other cyclical or periodic events can be analyzed. These observations must characterize the whole planet and its regional variations, and enable quantification of the processes that govern the Earth system. The full set of required observations requires many instruments on satellites in different orbits. Moreover, certain detailed measurements can only be made in situ.

Scientists have begun to look at the Earth as a complex, integrated system. This multidisciplinary vision requires comprehensive data collection spanning the geosphere, hydrosphere, atmosphere, cryosphere, and biosphere, and the processes that govern interactions between these subsystems. Indeed, an interdisciplinary approach must be embraced if we are to understand the Earth's systemic behavior.

In addition to integrated measurements of Earth system processes, researchers must also adopt an interdisciplinary approach in analyzing the collected data and disseminating the resulting information. In the past, the diverse disciplines that comprise the Earth sciences developed independently, and scientists and engineers tended to pursue discrete research objectives and strategies. Advances in observational methods, theories, and models in the fields of meteorology, oceanography, bioclimatology, ecology, geochemistry, geomorphology, and hydrology remained unique. Now, however, three forces have combined to alter the modes and focus of research:

1) Discipline studies have matured to the point that investigators are reaching the limits of traditional research, blurring the distinction between disciplines.
2) The perspective of Earth from space encourages an integrated approach, which views the planet as a system.
3) The growing awareness and apprehension about the effects of human-induced global change makes interdisciplinary methods essential.

These three forces have led to the definition of several central problems that require the unified perspective now known as Earth System Science . For those who make observations of the Earth system and develop models of its operation, Earth System Science means the creation of interdisciplinary models that couple elements from such formerly disparate sciences as ecology, oceanography and meteorology. This approach mandates a strategy to ensure collection, processing, archiving and disseminating of the data sought by the Earth scientists as well as those establishing environmental policy decisions.

MTPE plans to satisfy the dual requirements of an integrated approach to Earth observation and the development of meaningful products to aid global change researchers in their investigations. The MTPE Program will address high-priority science and environmental policy issues in Earth system science by flying instruments on intermediate-sized and smaller spacecraft. The program also includes a data and information system, EOSDIS, that will allow Earth scientists to study processes and develop better models.

1.1 EOSDIS. The need for a new paradigm for EOSDIS was laid out in the 1986 Report of the EOS Data Panel (NASA Technical Memorandum 87777). The Data Panel, comprised of Earth System Science researchers and international experts in data systems, pointed out some of the past difficulties of NASA data collection efforts including: lack of useful documentation; changes in personnel or dissolution of groups causing loss of knowledge of instruments and data characteristics, of calibration and processing procedures, and of data formats; lack of planning for hardware and personnel changes; data quality monitoring processes nonexistent; ... the perception of data archives as passive storehouses that at best only dispense data. The panel felt that all the problems led to a state where data value can only degrade with time. In pointing to the inherent difference between the long-time period EOS project and the previous, shorter (less than 10 years) data

collections, the data panel stated that the success of the EOS depends on changing existing practices in data collection and analysis.

To meet the call of the data panel, NASA is managing the data and information resulting from NASA's Earth science research satellites, field measurement programs, and other activities through the EOSDIS. EOSDIS supplies data archive, distribution, and information management, plus product generation and command and control functions. EOSDIS will provides data sets generated by assimilation of applicable observations into models.

To this end, EOSDIS must perform a wide variety of functions, supporting individuals located in various organizations and carrying on several distinct types of activity, including:

- Mission planning, scheduling, and control
- Instrument planning, scheduling, and control
- Resource management
- Communications
- Generation of standard data products
- Archiving of data, products, and research results
- Data cataloging, searching, browsing, and ordering
- Effective distribution of all information holdings
- User support.

An early version of EOSDIS, called Version 0, has been in operation since August 1994. Developed by the Earth Science Data and Information System (ESDIS) Project and 9 Distributed Active Archive Centers (DAACs), it provides users with access to past and current Earth science data. Interoperability among the DAACs has been implemented at the data set inventory level to facilitate searching and ordering in a one-stop shopping mode.

In the future (Oct. 97) seamless interoperability across existing EOSDIS DAACs will be provided through the instantiation of an architecture with several new system-wide functions including an advertising service, a distributed information management service, and accounting. The system will be built upon a common set of middleware included in the Communications and System Management Segment (CSMS) of the EOSDIS Core System (ECS) which provides the core common capabilities and infrastructure needed in EOSDIS. This CSMS currently uses the Distributed Computing Environment (DCE) standard to allow logically and physically distributed elements of EOSDIS to function as a whole.

1.2 EOS Standard Data Products. The MTPE space-based missions and associated observations are designed primarily to meet the needs of the Earth science community involved in Earth System Science, Earth science environmental applications, and natural resources management. These observations will be provided to the user community through EOSDIS. EOSDIS is currently designed to provide users with over 220 "standard" data products. These "standard" data products will provide significant potential value not only to the Earth science community, but also to a potentially large community of users who require and work with spatially oriented data to perform everyday responsibilities. This extended community includes federal agency resource managers, land use planners in state and local governments, as well as end-users in private industry, including remote sensing and Geographic Information System (GIS) value-added companies.

These 220 Standard Data Products provide the initial base for the 24 key long-time period science measurements collected by the EOS program. The 24 measurements have been identified by Global Change researchers as the minimum necessary for research and understanding of Global Climate Change. Phase 1 of MTPE is currently underway and involves collecting heritage data sets, producing new, consistent data sets from previously flown missions, and the continuing collection of data from Earth Probe missions currently operating. MTPE Phase 2 will commence in 1997 with the launch of TRMM, with the first EOS mission instruments on-board, and the launch of the Landsat - 7 satellite. MTPE Phase 2 will continue with the launch of AM-1 in 1998, PM-1 in 2000, CHEM-1 in 2002, and various smaller missions (e.g., Alt-Radar, ACRIMSAT, SOLSTICE, SAGE).

A list of the 24 key measurements and the EOS instruments that will provide them is in Appendix C, Section 2.

2.0 EOSDIS Support for Earth System Science Researchers

EOSDIS is a comprehensive end-to-end data and information system designed to provide fundamental, interdisciplinary data products; calibration information; and background documentation and metadata for use by Earth system science researchers. EOSDIS is being designed to maximize usability of the system by scientists and others.

2.1 Science Advisors. The successes of Version 0 (V0) and current developments in EOSDIS have resulted through the continuing involvement of Earth System Science users in an advisory role. The V0 DAACs are guided by Science Working Groups at each DAAC which prioritize development and new product production. EOSDIS tire-kickers have actively participated in the development of both Version 0 and ECS. They have reviewed designs, performed hands-on testing of prototypes and evaluation packages, and provided feedback to the developers in time to influence the design to meet better the science users requirements. All the ECS review boards have included strong representation by the users of the system. Earth system scientists are expected to continue to have a strong role in the EOSDIS Federation development and evolution.

2.2 User Demand. One area of concern for the EOSDIS developers has been to establish the appropriate level of user demand (pull) on the system. The Ad Hoc Working Group on Consumers (AHWGC), a group chartered by the EOSDIS Advisory Panel, assessed the user demand by Earth system science researchers. The AHWGC's findings were*:*

- Initial average daily pull by the EOS Interdisciplinary Science research projects and Instrument Teams should not exceed one and a half times the processing rate (1.5X, where X is the data volume generated per day) and may be closer to 1X given the history of pre-launch overestimating of data volume required for quality control. The planned 2X is reasonable for initial design.

- Estimation for the non-EOS research demand are bounded by 10 Petabytes/year (33X) in the extreme case and .5 Petabytes/year (2X) as a probable minimum.

- Ten percent of the data products will account for 90% of the pull.

Because the AHWGC felt that accurately estimating the non-science user population and needs was not possible, they recommended management options for MTPE to constrain the non-science user demand on the system.

- Load level to minimum acceptable performance.
- Use filters to determine the impacts of individual user requests on the system.
- Adopt a charging structure based on temporal requirement.
- Incubate industry partners to eventually off-load non-science demand.
- Increase capacity by purchasing more hardware.
- (As a last resort) prioritize user requests or use pricing policy to control demand.

3.0 NASA's Federation Concept

3.1 Federation Background

During the summer of 1995, the National Research Council's Committee on Global Change Research and Board on Sustainable Development reviewed the EOSDIS as a part of their overall review of the Global Change Research Program, NASA's MTPE and the EOS. They made the following two key recommendations (see Appendix C, Section 3 for references):

- "The components of the EOSDIS now under development for flight control, data downlink and initial processing should be retained but streamlined," and

- "Responsibility for product generation, publication, and user services should be transferred to a federation of partners selected through a competitive process open to all."

They proposed a new concept of an Earth Sciences Information System with a revised management approach. This new concept distributes many of the functions of the system to a variety of organizations (government, academic and private) selected through an open, competitive process. Those organizations are referred to as NASA Earth Science Information Partners (ESIPs). Similar organizations may develop outside NASA's sponsorship. The collection of such ESIPs constitutes a privatized, market-driven federation of product generation and enhancement capabilities. Some of the challenges and issues identified by the NRC were management of collaboration in a competitive environment, governance avoiding top-down centralized management, sensitivity during transition to international partners' expectations, and possible savings in costs through reassessment and relaxation of system performance and reliability requirements.

The NRC recommended that the transition to the new concept be carefully managed. They suggested an immediate study to develop a plan, and "although such a study may demonstrate that a gradual or incremental transition to the new system is advisable, ... the initial effort should be directed toward effecting a dramatic break with the past and creating an entirely new and contemporary federated management and operation ..."

NASA has responded to both of the above recommendations by the NRC. In response to the first recommendation, NASA has streamlined the functions and reduced their estimated costs.

3.2 Response Task Force Conclusions

During the past eight months, NASA has developed the response to the NRC's call for the establishment of a Federation of Earth Science Information Partners. Our model for the Federation governance and implementation has evolved under the careful thought and advice of the scientists on the Response Task Force. In response to the recommendations of the NRC, the EOS Payload Panel, and the EOSDIS Advisory Panel MTPE concluded that the issues of federation governance and interoperability would be best resolved experimentally using a working prototype Federation.

Another conclusion was that a one-size-fits-all federation could not succeed due to the wide disparity in requirements for data centers and center interactions among different research communities. MTPE recognized that an optimum methodology for encouraging innovation and research support in EOSDIS would be to separate the data centers concentrating on operational data production and distribution from those supporting algorithm research and new Earth system science product development. This principle allows data centers to be grouped by purpose or role and their interoperability requirements to be established accordingly. NASA calls this hierarchy of federations the "Federation of Federations."

For the period 1996-2000, NASA plans to implement at least two federations, a Baseline Federation and a Working Prototype Federation (WPF). The Baseline Federation will comprise the current DAACs and will be integrated by the NASA and organizations responsible for EOS standard products from spacecraft (TRMM, EOS AM-1, EOS PM-1 and ADEOS-II) planned to be launched through the year 2000. The Baseline Federation will be integrated by NASA MTPE. The WPF will be formed by, but not limited to, the NASA funded WP-ESIPs selected under this CAN and the Type 2 WP-ESIPs selected under the companion CAN-97-MTPE-01. It is also possible that Type 3 ESIPs may eventually choose to form a third federation.

3.3 ESIP Roles and Functions

Generically, ESIPs will be entities providing environmental information services to the Earth System Science research community and who have chosen to participate in the Environmental Information Federation. Within EOSDIS, ESIPs will be responsible for the production, archiving, distribution and user services associated with sets of fundamental products and will participate in the NASA Working Prototype Federation of Federations. They will be competitively selected to take responsibility for specific sets of products or for specific areas of support to the broad research community. They must establish and achieve strong and supportive working partnerships with their Science Team(s); they also must achieve strong, supportive relationships with their research or commercial users. They must provide their services to all users in a non-discriminatory basis.

For the purposes of NASAs program, the ESIPs are viewed as being of three types, as follows:

> Type 1 ESIPs are responsible for standard data and information whose production, publishing/distribution, and associated user services requires considerable emphasis on reliability and disciplined adherence to schedules;
>
> Type 2 ESIPs are responsible for data and information products and services in support of Earth System Science (other than those provided by the Type 1 ESIPs) that are developmental or research in nature or where emphasis on flexibility and creativity is key to meeting the advancing research needs; and
>
> Type 3 ESIPs are those providing MTPE-based data and information products and services to users beyond the Earth System Science research community who enter into joint endeavor agreements with NASA MTPE in order to extend the benefits of MTPE beyond the research community or to enhance EOSDIS.

4.0 Working Prototype Federation

4.1 WP-Federation Challenges

The NRC (see references in Appendix C, Section 3) has identified several issues of federation that have yet to be resolved. Some of the challenges and issues identified by the NRC were: management of collaboration in a competitive environment, including effective collaboration and scheduling mandated by data set interdependencies; intellectual leadership within a decentralized system, e.g. for standards definition; governance avoiding top-down centralized management; sensitivity during transition to international partners' expectations; possible savings in cost through reassessment and relaxation of system performance and reliability requirements; and the continued viability the Internet.

NASA MTPE will facilitate the governance of the WP-Federation, but does not plan to centrally manage the federat of collaborating entities, which must be able to expand. (See Section 1.5 for NASA's planned participation.) One c the key aspects of the prototyping is to explore governance and collaboration among competing WP-ESIPs. The governing rules, organizational and technical interfaces are expected to be evolved by the WP-Federation.

Prior to the selection of the WP-ESIPs, in the July/August 1997 timeframe, the National Research Council is considering hosting a workshop on federation to discuss options for governance and other federation issues. The results of the workshop, if available, will be provided to the WP-Federation at the first implementation meeting. NASA MTPE will review the workshop results for recommendations on its facilitation of the WP-Federation experiment.

NASA plans to convene the first meeting of the WP-Federation approximately one month after the negotiation of formal Cooperative Agreements has been completed. At this meeting, the WP-ESIPs are expected to present their individual background, experience and proposed work. Among the problems confronting the WP-Federation will b define a process for subsequent meetings, operation and decision making; and to establish ground rules for organizational interfaces and determining how and what level of system interoperability is to be achieved. NASA w make available experience, standards, and tools developed by or for EOSDIS as requested by the WP-Federation to assist in these decisions. However, it is the WP-Federation that must decide upon a consensus approach to the organizational interfaces, degree of integration and system interoperability.

NASA personnel will be made available to participate in Federation activities and will provide continuing technical coordination with EOSDIS.

4.2 Requirements for the WP-Federation

All WP-ESIPs chosen through this CAN shall participate in the WP-Federation. The focus of the WP-Federation i establish the means which will enable the full set of WP-ESIPs to appear to users as an easily approached whole wh preserving the independence, flexibility, and efficiency of the individual WP-ESIPs. The purpose of the full participation of the Type 3 WP-ESIPs in an ongoing WP-Federation is to demonstrate the viability of the Federation approach to making Earth system science data easy to preserve, locate, access, and use. The minimal set of requirements to be considered by the WP-Federation to accomplish this are given below:

The WP-Federation will be user-driven. The current EOSDIS has a large number of advisors and user committees. NASA is soliciting recommendations from the EOS Investigator Working Group's EOSDIS Panel and from the NRC, as well as from proposers to this solicitation, concerning methodologies of user participation in the WP-Federation. As least annually, the WP-Federation will hold a User Conference. Further user involvement will be defined.

There are a variety of functions, interfaces, and services for which the WP-Federation membership will need to determine the appropriate level of standardization. These include:

- user interface
- cross-site search queries
- data formats
- metadata formats and content
- protocols for interoperability among data management systems
- data documentation
- Applications Program Interfaces (APIs)
- user services

The WP-ESIPs, acting for the WP-Federation, will be expected to develop and submit a proposal to NASA early in first year of performance to apply for funding for interoperability activities (see Subsection 4.3). These funds may b used for incremental developments needed to achieve the level of interoperability and/or data interuse as determined the WP-Federation and their maintenance, and system-wide metrics collection and reporting. The WP-Federation n choose to "hire" an independent integrating organization to support these functions, in which case, the joint proposal shall reflect this approach and request the appropriate funds.

The data products and algorithms made available by all WP-ESIPs receiving funding from NASA, at a minimum, must meet all U.S. Government-mandated standards. Presently these comprise applicable Federal Geographic Data Committee (FGDC) standards.

It is envisioned that the WP-Federation will need to:

- identify and respond to needs of user community for federated services;
- implement a process for establishment, evolution, and retirement of standards to meet community needs most c effectively;
- adopt, adapt, and evolve prototype standards and interfaces for interoperability;
- ensure that members meet minimum EOSDIS interface standards,
- evolve an effective form of federation governance.

The members of this WP-Federation will have a collective responsibility for meeting federation-as-a-whole data and services goals and the authority to assure that Federation objectives and standards are met.

To facilitate the dissemination of any public-domain products of this CAN, the WP-ESIPs will make them available an Internet-accessible server. As a minimum, the WP-ESIPs will use the Global Change Master Directory and/or t Advertising Service provided by EOSDIS, both of which conform to FGDC metadata standards, to announce the availability of their products and services. In the cases where it is appropriate, WP-ESIPs will transfer data to long-term archives or transfer data for longer term preservation at the end of the three year performance period.

This CAN provides candidate metrics and solicits additional metrics for the measurement of WP-ESIP and WP-Federation success. The WP-Federation will deliberate on the potential metrics and propose the set of metrics to be designated for NASA concurrence. (See Appendix B, Section 8.6.)

4.3 Interoperability in the WP-Federation

Each WP-ESIP will be responsible for local implementation of whatever standards and interfaces are ultimately determined by the WP-Federation. For the purposes of proposing to be a WP-ESIP, proposers are instructed to include in their implementation plans support for one of the following System-Wide Interface Layer (SWIL)

interoperability options (see Appendix B, Section 8.5 for specific proposal instructions; details for interoperability options can be found in the references listed in Appendix C, Section 3.0):

1. A selection from emerging set of technologies that permit the ESIP to be automatically searched and queried frc remote clients as if it is part of a larger whole (i.e., a "Federation").
2. Version 0 interoperability
3. EOSDIS Core System (ECS) interoperability
4. CEOS Catalog Interoperability Protocol (CIP)
5. Federal Geographic Data Committee (FGDC) Clearinghouse Geo Profile

Proposals will be evaluated for compliance with this requirement (see Appendix C, Section 1, Group 5), but followi selection, successful WP-ESIP proposers will work with other members of the Working Prototype Federation to jointly determine and evolve these standards and interfaces.

Appendix B:Instructions for Responding to NASA Cooperative Agreement Notice

1.0 Policy

NASA does not allow a proposal, the contents of which are not available without restriction from another source, or any unique ideas submitted in response to the CAN, to be used as the basis of a solicitation or in negotiation with other organizations.

A solicited proposal that results in a NASA award becomes part of the record of that transaction and may be available to the public on specific request; however, information or materials that NASA and the awardees mutually agree to be of a privileged nature will be held in confidence to the extent permitted by law, including the Freedom of Information Act.

NASA may select only a portion of a proposed application, in which case the investigator will be given the opportunity to accept or decline such partial acceptance.

2.0 Rights in Data

The cooperative agreements resulting from this CAN shall be governed by the standard rights in data provisions as defined by the NASA Grant and Cooperative Agreement Handbook NPG 5800.1D dated July 23, 1996. The non-for-profit and educational institutions shall follow the provisions stated in Section 1260.29 while the commercial organizations will follow the provisions in Section 1274.905.

3.0 CAN-Specific Items

A brief outline of the Earth science data available in EOSDIS currently and in the near future, is referenced in Appendix C, Section 2. Detailed descriptions of the data, relevant reports, plans, and other related documents are available upon request as also described in Appendix C in Section 3.

4.0 Letter of Intent

To determine the expertise required of peer reviewers in advance and to increase the efficiency of proposal management, it is requested that all proposers submit a Letter of Intent. The letter of intent is available electronically at URL:http://www.mtpe.hq.nasa.gov/LOI/FORM.html. We urge you to use these electronic letter of intent forms unless you do not have access to Internet. In that case, we will accept a mail or fax copy sent to (202) 554-3024 with the following information:

- PL and PM names and address (including zip+ 4);
- Title of Proposal;
- Telephone number;
- Fax number;
- E-mail address and;
- A brief summary of what you plan to propose.

NASA recognizes that some adjustments may be needed for completing the final proposal. Items which may change appropriately are: proposal title, final budget request, and PL's supporting or participating.

The Letter of Intent should be submitted electronically, faxed or postmarked by midnight, June 11, 1997.

Mail or FAX the Letter of Intent to:

Office of Mission To Planet Earth
Extending the Use and Application Of Mission To Planet Earth (MTPE) Data and Information to the Broader User Community
CAN-97-MTPE-02
400 Virginia Ave. SW.
Suite 700
Wash D.C. 20024
(202) 554-2775 (Use only for overnight service)
FAX: (202) 554-3024

5.0 Conformance Guidance

Proposals shall conform to the procedural and submission guidelines covered in these instructions. In particular, NASA may accept proposals without discussion; hence, proposals should initially be as complete as possible and be submitted on the proposers' most favorable terms.

In order to be considered responsive to the solicitation, a submission must, at a minimum, present a specific project within the areas delineated by the CAN; contain sufficient technical and cost information to permit a meaningful evaluation; be signed by an official authorized to legally bind the submitting organization; not merely offer to perform standard services or to just provide computer facilities or services; and not significantly duplicate a more specific, current, or pending NASA solicitation. NASA reserves the right to

reject any or all proposals received in response to the CAN when such action is considered in the best interest of the Government.

6.0 Foreign Participation

NASA accepts proposals from entities outside the U.S. in response to this CAN. Proposals from non-U.S. entities should not include a cost plan. Non-U.S. proposals and U.S. proposals that include non-U.S. participants, must be endorsed by the government agency or funding/sponsoring institution in the country from which the non-U.S. participant is proposing. Such endorsement should indicate that if the proposal is selected, sufficient funds will be made available by the sponsoring foreign agency to undertake the activity proposed.

NASA gives notice to non-U.S. organizations that already have agreements with NASA involving data system interoperability with EOSDIS that these agreements remain in force. Further, foreign organizations are not required to respond to this CAN in order to participate in cooperative efforts with NASA. This solicitation is for relationships to specifically help develop a working prototype for the EOSDIS Federation without disturbing other activities.

7.0 Purchase and Distribution of Data Products

The offeror may propose the use of current MTPE products (Appendix C, Section 2.0) or the purchase of limited amount of new data from other existing sources, if data from non-NASA sources can be demonstrated to enhance the value and utility of observations from NASA missions and meet the objectives of the MTPE commercial/application program. It is emphasized that the these purchases should be for purposes of limited test and evaluation purposes and identify only the data required to test and verify an application system. NASA, however, as a general rule, will not fund routine purchase of data from sources other than MTPE unless it can be demonstrated that the Government will benefit from purchase of such data at a reduced cost. Given the objective of this CAN is to promote the development of commercial and other applications of MTPE observations, the main focus of proposed activities should be on developing and demonstrating new applications or enhancing the existing applications based on the data from MTPE missions. MTPE discourages proposing to use NASA funds to purchase data from foreign sources.

8.0 Proposal Contents

Each proposal copy shall contain all submitted material, including a copy of the transmittal letter. The proposals shall have a fully completed and signed cover page and certifications, as enclosed in Appendix B Section 11.1 of this CAN. When completing the prefatory forms, please note that for proposals in response to CANs, NASA recognizes only one Project Lead (PL) for each proposal. Other investigators are designated Project Members (PMs), even if their contributions to the proposal and responsibilities are comparable to that of the PL.

The proposer's sponsoring institution shall endorse all proposals. Only properly endorsed proposals are acceptable. The cover page contains space for this endorsement by an institutional representative authorized to legally bind the institution to perform the proposed effort. If substantial collaborations with other institutions are involved, then letters of endorsement shall be submitted by the responsible officials from those institutions. Each endorsement letter shall indicate agreement with the nature of the collaboration detailed in the proposal, which shall be identified by title and date of submission. All endorsement letters shall refer to the " Extending the Use and Applications Of Mission To Planet Earth (MTPE) Data and Information to the Broader User Community " CAN of the Office of Mission To Planet Earth.

Proposals shall contain:

- Transmittal Letter (Section 8.2)
- Cover Sheet (Section 11.1)
- Table of Contents
- Abstract (Section 8.3)
- Project Description (Section 8.4)
- Participation and Interoperability in the WP-Federation (Section 8.5)
- Metrics (Section 8.6)
- Management Plan (Section 8.7)
- Personnel (Section 8.8)
- Facilities and Equipment (8.9)
- Proposed Costs (Sections 8.10, 11.5)*
- Cooperative Agreement Payment Schedule (Section 8.11)*
- Statement of Current and Pending Support (Section 8.12)*
- Special Matters Section (Section 8.13)*
- Certification Regarding Debarment, Suspension, and Other Responsibility Matters (Appendix B, Section 11.2)*
- Certification Regarding Drug-Free Workplace Requirements (Appendix B, Section 11.3)*
- Certification Regarding Lobbying (Appendix B, Section 11.4)*

Proposals are expected to be written concisely in English to minimize the burden on the reviewers and to facilitate the overall evaluation process. The total length of proposal excluding cover page, prefatory material, and list of references shall not exceed 30 pages of 8.5" x 11" paper, with a maximum of 52 lines per page (point size 12 or larger, with 1-inch margins). Proposals using type smaller than 12 points, compressed type, or less-than normal leading (space between lines), which makes reading difficult will be returned unreviewed.

Review panels will schedule reviews based on 30 pages of technical material per proposal. Technical and resource reviewers will be instructed to consider the first 30 pages of technical material only. The material excluded from the 30 page limit is identified in the above list by an asterisk.

To facilitate the recycling of shredded proposals after review, proposals shall be submitted on plain, white paper only. This precludes the use of cardboard stock, plastic covers, colored paper, and binders such as 3-ring, GBC, spiral, plastic strips, etc.

8.1 Restriction on Use and Disclosure of Proposal Information

It is NASA policy to use information contained in proposals for evaluation purposes only. While this policy does not require that the proposal bear a restrictive notice, offerors or quoters should, in order to maximize protection of trade secrets or other information that is commercial or financial, and confidential or privileged, place the following notice on the title page of the proposal and specify the information subject to the notice by inserting appropriate identification, such as page numbers, in the notice. In any event, information (data) contained in proposals will be protected to the extent permitted by law; but, NASA assumes no liability for use and/or disclosure of information not made subject to the notice.

NOTICE

Restriction on Use and Disclosure of Proposal Information

The information (data) contained in [insert page numbers or other identification] of this proposal constitutes a trade secret and/or information that is commercial or financial, and confidential or privileged. It is furnished to the Government in confidence with the understanding that it will not, without permission of the offeror, be used or disclosed other than for evaluation purposes; provided, however, that in the event a grant or cooperative agreement is awarded on the basis of this proposal, the Government shall have the right to use and disclose this information (data) to the extent provided in the grant or cooperative agreement. This restriction does not limit the Government's right to use or disclose this information (data) if obtained from another source without restriction.

8.2 Transmittal Letter Requirements

The transmittal letter shall contain the following information:

(a) The legal name and address of the organization and specific division or campus identification, if part of a larger organization;

(b) A brief, scientifically valid project title intelligible to a scientifically literate reader and suitable for use in the public press;

(c) Type of organization; e.g., profit, nonprofit, educational, small business, minority, women-owned, etc.;

(d) Name and telephone number of the Project Lead and business personnel who may be contacted during evaluation or negotiation;

(e) Identification of any other organizations that are currently evaluating a proposal for the same effort;

(f) Identification of the specific CAN, by number and title, to which the proposal is responding (CAN-97-MTPE-02);

(g) Dollar amount requested of NASA, desired starting date, and duration of project;

(h) Date of submission.

(i) Signature of a responsible official or authorized representative of the organization, or any other person authorized to legally bind the organization.

8.3 Abstract

Include a concise (200-300 words) abstract describing the objective of the proposed effort and the method of approach.

8.4 Project Description

The project description section shall contain a brief summary, followed by a description of the applications and technical objectives of the proposed investigation, the approach, and the expected results.

The main body of the proposal shall be a detailed description of the work to be undertaken and should include objectives and expected significance; relation to the present state of knowledge in the field; and relation to previous work done on the project and to related work in progress elsewhere. The description should outline the general plan of work, including the broad design of experiments to be undertaken and a description of experimental methods and procedures. The project description should be prepared in a manner that addresses the evaluation factors in these instructions. Any substantial collaboration with individuals not referred to in the budget or use of consultants should be described.

When it is expected that the effort will require more than 1 year for completion, the proposal should cover the complete project to the extent that it can be reasonably anticipated. Principle emphasis should, of course, be on the first year of work, and the description should distinguish clearly between the first year's work and work planned for subsequent years.

8.5 Participation and Interoperability in the EOSDIS Federation

A major purpose of this CAN is to experiment with management and technical approaches for cost effectively providing data services to a diverse user community through cooperating, autonomous data centers. In addition to providing new scientific products, prototyping technology and meeting their individual user data needs, each WP-ESIP will be expected to participate fully as a member of a Prototype Federation. Appendix A includes a description of and process for implementation of the Prototype Federation.

Each WP-ESIP proposal shall address their participation in the Prototype Federation and include a proposed level of interoperability with the initial Federation. Possible options for interoperability are discussed in Appendix A, Section 4.3. The proposal shall also address performance measures for the Prototype Federation as a whole and metrics for the local WP-ESIP instantiation.

Proposals will be evaluated for compliance with this requirement, but following selection, successful WP-ESIP proposers will work with other members of the Working Prototype Federation to jointly determine and evolve these standards and interfaces. Proposers should demonstrate knowledge of their recommended interoperability option by describing the reason for their selection and how it would assist them to better serve their targeted users and to be able to make a stronger contribution as a member of the Federation as a whole.

8.6 Metrics

The proposals shall address metrics for measuring the performance and success of the individual WP-ESIPs and the Federation as a whole. Sample candidate metrics measuring the success of individual Type 3 ESIPs in MTPE Data and Science Extensions/Applications, and the contributions of the ESIPs to the Federation are indicated below. The proposers shall address these metrics and provide additional metrics to assess the success of their performance.

8.6.1 MTPE Data and Science Extensions/Applications Metrics

The ultimate success of the Type 3 ESIPs will be measured by the success of their transition to self-sustaining for profit businesses using MTPE data as part of new or emerging information products lines; or the successful technology transfer and institutionalization of MTPE data as part of new information products processes in the governmental or non-profit sectors produced and disseminated for the public good. Specific examples of candidate metrics are as follows:

- Enable industry and the non-profit or public sectors to achieve significant productivity gains (cost savings or new capabilities previously non-existent) in their uses of MPTE data as an input to their spatial information technology and services.

- Develop viable new markets for spatial information technologies and the related end products involving MTPE data.

- Develop generic, widely available industry or public sector processes or products that improve the general cost-effectiveness and efficiency of the using organizations.

- Attain the timely distribution and successful adoption of these MTPE related information products in industry and the public sector.

8.6.2 Federation Metrics

The contributions of the individual WP-ESIP's to the success of the overall Federation can potentially be measured by the following:

- Identify and enumerate existing obstacles to making data easier to find, access and use and develop metrics to measure removal of obstacles. (Goal: To measure success of the Federation in improving data access and use.)

- Identify user community types, identify services required per community, enumerate those services, and develop metrics to measure total services provided to the community. (Goal: To measure success of the Federation in providing services required by a large, diverse user community.)

- Identify users needs for timely delivery of data products, and compare the achieved timeliness with the users needs. (Goal: To measure success of the Federation in meeting users' needs for products in a timely manner.)

8.7 Management Approach

Some projects involve joint efforts among individuals in different organizations or mutual efforts of more than one organization. Where multiple organizations are involved, the proposal shall be submitted by only one of them. In this event, plans for dissemination of responsibilities and any necessary arrangements for ensuring a coordinated effort should be described and the proposal shall indicate the legal and managerial arrangements. For efforts involving interactions among individuals from more than one organization, plans for dissemination of responsibilities and any necessary arrangements for ensuring a coordinated effort should be described. Also, any special industry-university cooperative arrangements should be described.

8.8 Personnel

For each PL or PM, a brief biographical sketch referencing related work shall be included, along with citations of the most relevant recent publications and any exceptional qualifications covering the past 5 years. The biographical sketch and publications list shall not exceed one page per PL or PM. A summary of other participants shall not exceed one page.

The Project Lead is responsible for direct supervision of the work and participates in the conduct of the project regardless of whether or not compensation is received under the award. Omit social security number and other personal items which do not merit consideration in evaluation of the proposal. Give similar biographical information on other senior professional personnel who will be directly associated with the project. Give the names and titles of any other scientists and technical personnel associated substantially with the project in an advisory capacity. Universities should list the approximate number of students or other assistants, together with information as to their level of academic attainment. Any special industry-university cooperative arrangements should be described.

8.9 Facilities and Equipment

Describe available facilities and major items of equipment especially adapted or suited to the proposed project, and any additional major equipment that will be required. Identify any Government-owned facilities, industrial plant equipment, or special tooling that are proposed for use on the project.

Before requesting a major item of capital equipment, the proposer should determine if sharing or loan of equipment already within the organization is a feasible alternative to purchase. Where such arrangements cannot be made, the proposal should so state. Title and disposition of equipment purchased with Government funds will be determined for each cooperative agreement depending upon the nature of the recipient (i.e., nonprofit or profit making company) and other factors.

8.10 Proposed Costs

Proposals shall contain cost and technical parts in one volume; do not use separate "confidential" salary pages. In addition to the instructions contained here, proposers are referred to Section 12. This section contains a model format for a yearly Budget Summary and line by line instructions along with the Certification Regarding Drug Free Workplace Requirements and the Certification Regarding Debarment, Suspension, and Other Responsibility Matters required in all proposals. The Certification Regarding Lobbying is only required if the proposed budget is over $100,000.

The budget section of the proposals shall include a budget breakdown by Government fiscal year (October 1 to September 30) for each year of the proposed work.

If proposals involve collaborations with PMs who are at institutions different from that of the PL, and those PMs require funding support, the budget total of each participating institution shall be listed as Subcontracts in the Proposal Budget Summary of the PL. Details of the budgets of such participating institutions shall be provided separately.

Costs of mandatory participation in the WP-Federation should be included in the costs. These costs include site implementation of the determined approach to the organizational interfaces; implementation and maintenance of system-wide requirements, standards and protocols; and work to be performed by the WP-ESIPs to interact with each other (e.g. meetings and telecons). Since the selected WP-ESIPs will propose as a group for the funds for the development and/or adaptation of the selected System-Wide Interface Layer (SWIL) and associated interoperability activities, proposals should not include these estimated costs in their proposed budgets.

8.11 Cooperative Agreement Payment Schedule

Meaningful milestones spread throughout the three year award period must be proposed. Milestones are required to be performance based and based on verifiable significant events. Team payments will be based upon completion of milestones. Generally no more than two payment milestones should be proposed per year. Milestone payments will be finalized during negotiations of formal Cooperative Agreements.

8.12 Current and Pending Support

The proposal shall contain a summary of current and pending Federal support of all projects with substantial involvement of the PL and each PM for whom support is requested. The information content shall include: source of support, project title with grant or contract number, award amount by Government fiscal year, and total award amount, award period, level of effort in person-months, and the location where the work is to be performed.

8.13 Special Matters

All commercial awardees will be subject to terms and conditions under NASA Grant and Cooperative Agreement Handbook, Part 1274, Sections 901 through 932 and Appendices A through C (See Appendix C,

Section 3.1 for handbook reference.), unless otherwise indicated in this CAN, when Cooperative Agreements are negotiated after notification of selection. Offerers should pay careful attention to these referenced provisions and conditions and indicate in their proposal if they take exception to any of these terms and conditions.

Include any required statements of environmental impact of the work, human subject or animal care provisions, conflict of interest, or on such other topics as may be required by the nature of the effort and current statutes, executive orders, or other current Government-wide guidelines.

Proposers should include a brief description of the organization, its facilities, and previous work experience in the field of the proposal. Identify the cognizant Government audit agency, inspection agency, and administrative contracting officer, when applicable.

9.0 Proposal Submission Requirements and Deadline

Ten (10) copies of the proposal shall be sent to the following address.
Extending the Use and Application Of Mission To Planet Earth (MTPE) Data and Information to the Broader User Community
CAN-97-MTPE-02
400 Virginia Ave. SW Suite 700
Wash D.C. 20024
(202) 554-2775 (Use only for overnight service)
FAX: (202) 554-3024

Foreign proposers should submit an additional copy to:
Office of External Relations
Mission to Planet Earth Division, Code IY
300 E street, SW
NASA Headquarters
Washington, DC 20546 USA

Proposals must be received on or before 4:30 p.m. EST on July 14, 1997 in order to be considered for selection under this CAN.

10.0 Withdrawal

Proposals may be withdrawn by the proposer at any time. Offerors are requested to notify NASA if the proposal is funded by another organization or other changed circumstances which dictate termination of evaluation.

11.0 Proposal Format

11.1 Proposal Cover Sheet

Cooperative Agreement Notice 97-MTPE-02

Proposal No. _____ (Leave Blank for NASA Use)

Title: _____

Project Lead:

Name: _____

Department:_____

Institution: _____

Street/PO Box: _____

City: _____ State: _____ Zip: _____

Country: _____ E-mail:_____

Telephone: _____ Fax: _____

Name . . . . . Institution . . . . . Telephone . . . . . Email
Project Members:

_____ _____ _____ _____

_____ _____ _____ _____

Other Named Individuals:

_____ _____ _____ _____

_____ _____ _____ _____

Funding Profile:

	Requested of NASA	Cost Share (if any)	Budget Total
1st Year:	_____	_____	_____
2nd Year:	_____	_____	_____
3rd Year:	_____	_____	_____
4th Year:	_____	_____	_____
5th Year:	_____	_____	_____
Cumulative Total	_____	_____	_____

Relevant Application Category(s):_____

Authorizing Official:

(Name)_____ (Institution)_____

Proposal Cover Sheet Instructions

The information you provide in this fact sheet will be used to create a unique data record about your proposal. This information will be used for tracking, review, evaluation, and all correspondence with you and your institution. Please ensure that the data listed here are in complete agreement with any similar information appearing elsewhere in your proposal.

This required information should be listed in the following order:

Project Lead Information (Title, Name, Full Address, Phone, Fax, and Email)

Project Member Information (Title, Name, Institution, Phone, and Email)

Other Named Individuals, if applicable (Title, Name, Institution, Phone, and Email)

If your proposal identifies other named personnel or collaborators who would be participating in the proposed activities, you must include contact information for them (regardless of whether funding for these individuals is requested). This information will be used to avoid conflicts of interest during the review and evaluation process.

Funding Profile:

Show funding profile by year, breaking out funding profile by funding requested of NASA, and proposed cost shar
If joint project with multiple institutions, show breakouts by group and total cost per period.

Relevant Application Category(ies) (e.g. agriculture, forestry, marine fisheries)

11.2 Certification Regarding Debarment, Suspension, and Other Responsibility Matters Primary Covered Transactions

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 34 CFR Part 85, Section 85.510, Participant's responsibilities. The regulations were published as Part VII of the May 26, 1988 Federal Register (pages 19160-19211). Copies of the regulation may be obtained by contracting the U.S. Department of Education, Grants and Contracts Service, 400 Maryland Avenue, S.W. (Room 3633 GSA Regional Office Building No. 3), Washington, DC. 20202-4725, telephone (202) 732-2505.

(1) The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statues or commission of embezzlement theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and

(d) Have not within three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

(2) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

_____

Organization Name PR/Award Number or Project Name

_____

Name and Title of Authorized Representative

_____

Signature

_____

Date

ED Form GCS-008 (REV.12/88)

11.3 Certification Regarding Drug-Free Workplace Requirements Grantees Other Than Individuals

This certification is required by the regulations implementing the Drug-Free Workplace Act of 1988, 34 CFR Part 85, Subpart F. The regulations, published in the January 31, 1989 Federal Register, require certification by grantees, prior to award, that they will maintain a drug-free workplace. The certification set out below is a material representation of fact upon which reliance will be placed when the agency determines to award the grant. False certification or violation of the certification shall be grounds for suspension of payments, suspension or termination of grants, or government wide suspension or debarment (see 34 CFR Part 85, Sections 85.615 and 85.620).

This grantee certifies that it will provide a drug-free workplace by: (a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition; (b) Establishing a drug-free awareness program to inform employees about -

1. The dangers of drug abuse in the workplace;
2. The grantee's policy of maintaining a drug-free workplace;
3. Any available drug counseling, rehabilitation, and employee assistance programs, and
4. The penalties that may be imposed upon employees for drug abuse violations in the workplace;

(c) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (a); (d) Notifying the employee in the statement required by paragraph (a) that, as a condition of employment under the grant, the employee will -

1. Abide by the terms of the statement; and
2. Notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five days after such conviction;

(e) Notifying the agency within ten days after receiving notice under subparagraph (d)(2) from an employee or otherwise receiving actual notice of such conviction; (f) Taking one of the following actions, within 30 days of receiving notice under subparagraph(d)(2) , with respect to any employee who is so convicted -

1. Taking appropriate personnel action against such an employee, up to and including termination; or
2. Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency;

(g) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraph (a), (b), (c), (e), and (f).

_____

Organization Name PR/Award Number or Project Name

_____

Name and Title of Authorized Representative

_____

Signature

_____

Date

ED 80-0004

11.4 Certification Regarding Lobbying

Certification for Contracts, Grants, Loans, and Cooperative Agreements.

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000, and not more than $100,000 for each such failure.

Signature and Date

Name and Title of Authorized Representative

Organization Name

11.5 Budget Summary and Line by Line Instructions

BUDGET SUMMARY
199-

	NASA Funding	Cost Share	199- Total	CUMULATIVE TOTAL
1. Direct Labor (salaries, wages, fringe benefits)				
2. Total Direct Labor Hours				
3. Other Direct Costs:				
a. Subcontractors				
b. Consultants				
c. Equipment				
d. Supplies				
e. Travel				
f. Other				
4. Indirect Costs, Including Percent				
5. Other Applicable Costs				
6. Total Costs				

Budget Summary Line by Line Instructions

For each year of proposed work, complete a Budget Summary Sheet. In the first column, complete line by line instructions below for budget requested from NASA. In the second column, similarly enter the amount of cost sharing proposed, if any. The third column should contain the total annual project budget, and the fourth column the project budget cumulative total. Provide in attachments to the budget summary the detailed computation of estimates in each cost category, along with any narrative explanation required to fully explain proposed costs.

1. Direct Labor (salaries, wages and fringe benefits): Attachments should list number and titles of personnel, amount of time to be devoted to the effort and hourly rates of pay.

2. Total Direct Labor Hours: Show total number of estimated labor hours required to accomplish the task.

3. Other Direct Costs:

a. Subcontractors - Attachments should describe the work to be subcontracted, estimated amount, recipient (if known), and the reason for subcontracting this effort.

b. Consultants - Identify consultants to be used, why they are necessary, time to be spent on the project, and rates of pay (not to exceed the equivalent of the daily rate for GS-18 in Federal service: $429 per day as of January 12, 1992, excluding expenses and indirect cost).

c. Equipment - List separately and explain the need for items of equipment exceeding $1,000. Describe the basis for the estimated cost. General-purpose, non-technical equipment is not allowable as a direct cost to NASA cooperative agreements unless specifically approved by the Contracting Officer.

d. Supplies - Provide general categories of needed supplies, the method of acquisition, estimated cost, and the basis for the estimate.

e. Travel - List proposed trips individually, describe their purpose in relation to the grant, provide dates, destination, and number of travelers where known, and explain how the cost for each was derived.

f. Other - Enter the total of any other direct costs not covered by 3a through 3e. Attach an itemized list explaining the need for each item/category and the basis for the estimate.

4. Indirect Costs: Identify indirect cost rate(s) and base(s) as approved by the cognizant Federal agency, including the effective period of the rate. If unproved rates are used, explain why and include the computational basis for the indirect expense pool and corresponding allocation base for each rate. Provide the name, address, and telephone number of the Federal agency and official having cognizance over such matters.

5. Other Applicable Costs: Enter the total of any other applicable costs. Attach an itemized list explaining the need for each item and the basis for the estimate.

6. Total Estimate Costs: Enter the sum of items 1, 3.a, through 3.f, 4, and 5.

Appendix C: Background Information

1.0 Sensor Systems Application Summary (1998/1999)

SENSOR SYSTEM APPLICATIONS SUMMARY

EOSDIS SENSORS

1 - ACRIM
2 - AIRS/AMSU/MHS
3 - ASTER
4 - CERES
5 - DORIS/SSALT/AMR
6 - EOS Color
7 - EOSP
8 - ETM+
9 - GLAS
10 - HIRDLS
11 - LIS
12 - MIMR
13 - MISR
14 - MLS
15 - MODIS
16 - MOPITT
17 - ODUS
18 - SAGE III
19 - SeaWinds
20 - SOLSTICE
21 - TES

APPLICATION AREA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	TOTAL
1. DEVELOPMENT/CONESRVATION			X			X		X				X			X	X					X	**8**
2. PLANNING			X					X			X				X	X						**7**
3. MAPPING, CHARTING, GEODESY			X			X		X	X						X							**6**
4. LAND USE AND LAND COVER			X					X	X						X							**7**
5. AGRICULTURE		X	X					X				X			X							**8**
6. FORESTRY			X					X				X			X							**6**
7. RANGELAND			X					X				X			X							**7**
8. EMERGENCY MANAGEMENT			X					X			X				X							**6**
9. TRANSPORTATION			X		X			X	X		X				X				X			**8**
10. EXPLORATION AND EXTRACTION			X					X	X						X							**6**
11. WEATHER CLIMATE		X	X	X	X	X	X		X		X	X	X		X	X	X	X	X		X	**16**
12. AIR QUALITY		X	X				X		X			X		X	X	X	X	X			X	**12**
13. WATER QUALITY			X					X							X							**5**
14. WATER RESOURCES			X					X							X							**5**
15. FISHERIES		X	X		X	X		X							X							**6**
16. MARINE		X	X		X	X		X	X						X				X			**10**
17. RECREATION			X			X		X							X						X	**5**
18. INFORMATION/INTELLIGENCE		X	X			X		X							X						X	**8**

X = POTENTIAL APPLICATION OF SENSOR OR DATA PRODUCT

2.0 MTPE Measurement Sets

MTPE plans to collect 24 key measurements on a global scale over a long-time period. The 24 measurements have been identified by Global Change Researchers as the minimum necessary for research and understanding of Global Climate Change. Phase 1 of MTPE is currently underway and involves collecting heritage data sets, producing new, consistent data sets from previously flown missions, and the continuing collection of data from Earth probe mission currently operating. MTPE Phase 2 will commence in 1997 with the launch of TRMM, with the first EOS mission instruments on-board, and the launch of the LandSat - 7 satellite. EOS Phase 2 will continue with the launch of AM-1 in 1998, PM-1 in 2000, CHEM-1 in 2002, and various smaller missions (e.g., Alt-Radar, ACRIMSAT, SOLSTICE, SAGE).

Following is a list of the 24 different measurements that MTPE will make in support of US Earth System Science Research along with a list of current and future instruments or data production activities which provide those measurements. Only the data sets generated from US developed instruments are included . Further information on the MTPE measurements and data sets including temporal and spatial frequency, resolution, and archive volumes can be obtained from the references list in Appendix C, Section 3.2.

24 MTPE Measurements

ATMOSPHERE		
Cloud Properties	Current	GOES Pathfinder, TOVS Pathfinder, ISSCP, TOGA/COARE, FIRE
	Available by 1999	TRMM-VIRS,MODIS, MISR, SAGEIII
Radiative Energy Fluxes	Current	SMMR, SSMI Pathfinder, GOES Pathfinder, AVHRR Pathfinder, ISSCP, Landsat, ERBE, ERBS, TOGA COARE, FIRE
	Available by 1999	TRMM-(VIRS, CERES, TMI), CERES, ACRIM, MODIS, MISR, SAGE IIII
Precipitation	Current	SSMR, SSMI Pathfinder, TOGA/COARE
	Available by 1999	TRMM-(PR,TMI)
Tropospheric Chemistry	Current	SAGE I & II, UARS-MLS
	Available by 1999	MOPITT, SAGEIII, LIS
Stratospheric Chemistry	Current	SAGE I&II, SBUV, UARS-(CLAES, ISAMS, MLS, HALOE, HRDI, WINDII), TOMS, ATMOS, AIRS
	Available by 1999	SAGEIII
Aerosol Properties	Current	SAGE I & II,
	Available by 1999	SAGEIII, MODIS, MISR
Atmospheric Temperature	Current	TOVS Pathfinder, DMSP-SSM/T
	Available by 1999	MODIS
Atmospheric Humidity	Current	SSMI Pathfinder, TOVS Pathfinder, SMMR
	Available by 1999	SAGEIII, DFA/MR, MODIS
Lightning	Current	DMSP-OLS, OTD
	Available by 1999	LIS

SOLAR RADIATION		
Total Solar Irradiance	Current	ERB, UARS-ACRIM
	Available by 1999	ACRIM
Ultraviolet Spectral Irradiance	Current	SBUV, UARS-(SOLSTICE, SUSIM), ATMOS
	Available by 1999	SOLSTICE
LAND		
Land Cover/Use Change	Current	AVHRR Pathfinder, Landsat Pathfinder, SSMI Pathfinder
	Available by 1999	ETM+, MODIS, MISR
Vegetation Dynamics	Current	Landsat Pathfinder, AVHRR Pathfinder, FIFE
	Available by 1999	MODIS, MISR, ETM+,
Surface Temperature	Current	SSMI Pathfinder, Landsat AVHRR Pathfinder, GOES Pathfinder, FIFE
	Available by 1999	MODIS, ETM+
Fire Occurrence	Current	Landsat
	Available by 1999	MODIS, ETM+, MISR
Volcanic Effects	Current	Landsat
	Available by 1999	MODIS, ETM+, MISR
Surface Wetness	Current	SSMI Pathfinder
	Available by 1999	
OCEAN		
Surface Temperature	Current	SMMR, AVHRR Pathfinder, SSMI Pathfinder
	Available by 1999	MODIS, AMSR, SeaWiFS
Phytoplankton & Dissolved Organic Matter	Current	CZCS,
	Available by 1999	MODIS, SeaWiFS
Surface Wind Fields	Current	SSMI Pathfinder, Seasat
	Available by 1999	SeaWinds
Ocean Surface Topography	Current	Geosat, Topex/Poseidon
	Available by 1999	DFA/MR
CRYOSPHERE		
Land Ice	Current	Seasat, Geosat
	Available by 1999	ETM+

Sea Ice	Current	ESMR, SSMR, SSMI Pathfinder, AVHRR Pathfinder
	Available by 1999	DFA/MR, MODIS, ETM+
Snow Cover	Current	SSMR, SSMI Pathfinder
	Available by 1999	MODIS, ETM+

3.0 References to other Relevant Reports, Plans, and Documents

3.1 Applicable Policies and Procedures Relating to Award and Administration of NASA Cooperative Agreements

NASA Grant and Cooperative Agreement Handbook (NPG 5800.1D dated July 23, 1996), Part 1260 of title 14 of the Code of Federal Regulations (CFR).

The Internet address where this document can be found is:
http://msfcinfo.msfc.nasa.gov/rschhdbk.html.

Subscriptions (the basic edition plus all changes issued for an indefinite time) to the handbook may be purchased from the Superintendent of Documents, United States Government Printing Office, Washington, DC 20402, telephone (202) 512-1800. Requests should cite GPO Stock No. 933-001-00000-8.

3.2 National Research Council Documents

National Research Council (NRC). 1995. A Review of the U.S. Global Change Research Program and NASAs Mission to Planet Earth/Earth Observing System. National Academy Press. Washington, D.C.

National Research Council (NRC). 1996. Letter Report from Moore, Berrien III, Chair, Committee on Global Change Research and Edward A. Frieman, Chair, Board on Sustainable Development to Dr. Robert W. Corell, Chairman, Subcommittee on Global Change Research, July 3,1996.

3.3 Information on MTPE

History of EOSDIS:
NASA,1986. Report of the EOS Data Panel. NASA Technical Memorandum 87777.

NASA Response to NRC Federation recommendations:
NASA, May 1996, Program Plan In Response to NRC Recommendations With Respect to EOSDIS

Information on NASAs Response Task Force and Federation model:
http://www.hq.nasa.gov/office/mtpe/eosdis

The following documents can be found at http://www.hq.nasa.gov/office/mtpe/

MTPE: A Program to Understand Global Environmental Change
The Earth Observer
Science Strategy for the Earth Observing System
The Earth Observing System Reference Handbook
The NASA Technical Report Server
EOSDIS Potential User Conference Proceedings

The document Understanding Our Changing Planet: NASAs Mission To Planet Earth can be found at:
http://spso.gsfc.nasa.gov/eos_publications/fact_book/fact_toc.html

The MTPE/EOS 1995 Reference Handbook can be found at:
http://spso.gsfc.nasa.gov/eos_reference/TOC.html

The MTPE Science Research Plan can be found at:
http://www.hq.nasa.gov/office/mtpe/draftsciplan/mtpe-srp.htm

The EOSDIS Science Data Plan can be reached via common http browsers as follows:
Go to:
http://eos.nasa.gov/

Select: "Services"
Select: "Gopher Access to EOS Documentation"
Walk the tree:
EosDis
Daacs
Docs
ScienceDataPlan
SDP_1996

SDP_1996 is a directory.
Get the files within that you desire.

Alternately, the EOSDIS Science Data Plan can be obtained from:
ftp://eos.nasa.gov//EosDis/Daacs/Docs/ScienceDataPlan/SDP_1996

3.4 Information on EOSDIS Core System

References to ECS Evolution can be found at:
http://ecsinfo.hitc.com

ECS document search services can be obtained at:
http://edhs1.gsfc.nasa.gov

3.4 URLs of Interest (Data, Sensor Descriptions, Information on Affiliated Data Systems

Information about the CEOS Catalog Interoperability Protocol (CIP)
can be found at
http://harp.gsfc.nasa.gov/cip

Access to information on FGDC and the FGDC Clearinghouse:
http://www.fgdc.gov

Access to Version 0 EOSDIS, the DAACs and their data holdings
http://eos.nasa.gov/imswelcome

Information about setting up a Version 0 EOSDIS Information Management System server and pointers to additional on-line documentation
http://harp.gsfc.nasa.gov:1729/eosdis_documents/server-cookbook.html

Information regarding the EOSDIS Core System can be obtained at:
http://ecsinfo.hitc.com

Links to copies of the ECS test datasets can be obtained at:
http://newsroom.gsfc.nasa.gov/eval/et3top.html
http://esdis.gsfc.nasa.gov/tdm

Information regarding the ESDIS Project at Goddard Space Flight Center, including system architecture and technology information, can be found at:
http://eos.nasa.gov/eosdis

Appendix D: Acronyms

ACRIM	Active Cavity Radiometer Irradiance Monitor
ADP	Automated Data Processing
AHWGC	Ad Hoc Working Group on Consumers
AHWGP	Ad Hoc Working Group on Production
AIRS	Atmospheric Infrared Sounder
AMSR	Advanced Microwave Scanning Radiometer
API	Applications Program Interface
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer
ATMOS	Atmospheric Observations Satellite
AVHRR	Advanced Very High Resolution Radiometer
CA	Cooperative Agreements
CAN	Cooperative Agreement Notice
CERES	Clouds and the Earths Radiant Energy System
CFR	Code of Federal Regulations
CIP	Catalog Interoperability Protocol
CLAES	Cryogenic Limb Array Etalon Spectrometer
COARE	Coupled Ocean Atmosphere Regional Experiment
Code Y	NASA Headquarters Office of Mission to Planet Earth
COTS	Commercial Off the Shelf
CSMS	Communications and System Management Segment
DAAC	Distributed Active Archive Center
DCE	Distributed Computing Environment
DFA	Dual-Frequency Radar Altimeter
DMSP	Defense Meteorological Satellite Program
ECS	EOSDIS Core System
EOS	Earth Observing System
EOSDIS	Earth Observing System Data and Information System
ERBE	Earth Radiation Budget Experiment
ERBS	Earth Radiation Budget Satellite
ESDIS	Earth Science Data and Information System
ESIP	Earth Science Information Partner
ESSP	Earth System Science Pathfinders
ETM	Enhanced Thematic Mapper
FAR	Federal Acquisition Regulation
FGDC	Federal Geographic Data Committee
FIRE	First ISCCP Regional Experiment
FoF	Federation of Federations
GIS	Geographic Information System
GOCO	Government Owned Contractor Operated
GOES	Geostationary Orbiting Environmental Satellite
GSA	General Services Administration
HALOE	Halogen Occultation Experiment
HPPI	High Performance Parallel Interface
HRDI	High Resolution Doppler Imager
HTML	Hyper Text Markup Language
IR&D	Independent Research and Development

ISAMS	Improved Stratospheric and Mesospheric Sounder
ISCCP	International Satellite Cloud Climatology Program
Landsat	Land Remote-Sensing Satellite
LIS	Lightning Imaging Sensor
LOI	Letter of Intent
LTAA	Long Term Active Archive
MISR	Multi-angle Imaging Spectroradiometer
MLS	Microwave Limb Sounder
MODIS	Moderate-Resolution Imaging Spectroradiometer
MR	Microwave Radiometer
MTPE	Mission to Planet Earth
NASA	National Aeronautics and Space Administration
NGO	Non-Governmental Organization
NRA	NASA Research Announcement
NRC	National Research Council
OLS	Optical Line Scanner
OMB	Office of Management and Budget
OTD	Optical Transient Detector
PDPS	Planning and Data Processing Subsystem
PL	Project Lead
PM	Project Member
PR	Purchase Request
PR	Precipitation Radiometer
RTF	Response Task Force
SAGE	Stratospheric Aerosol and Gas Experiment
SBUV	Solar Backscatter Ultraviolet
Seasat	Sea Satellite
SeaWiFS	Sea-Viewing Wide Field-of-View Sensor
SMMR	Scanning Multispectral; Microwave Radiometer
SOLSTICE	Solar Stellar Irradiance Comparison Experiment
SSMI	Special Sensor Microwave Imager
SUSIM	Solar Ultraviolet Spectral Irradiance Monitor
TES	Tropospheric Emission Spectrometer
TMI	TRMM Microwave Imager
TOGA	Tropical Oceans Global Atmospheres
TOMS	Total Ozone Mapping Spectrometer
TOVS	TIROS Operational Vertical Sounder
TRMM	Tropical Rainfall Measurement Mission
UARS	Upper Atmospheric Research Satellite
URD	User Requirements Document
URL	Universal Resource Label
USGCRP	US Global Climate Research Program
V0	EOSDIS Version 0
VIRS	Visible Infrared Scanner
WINDII	Wind Imaging Interferometer
WP	Working Prototype
WP-ESIP	Working Prototype Earth Science Information Partner
WPF	Working Prototype Federation
WWW	World Wide Web